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EXAMINER	
SENFI, BEHROOZ M	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/656,537	LILLEVOLD, KARL O.	
	Examiner	Art Unit	
	BEHROOZ SENFI	2621	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *28 July 2008*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-29* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-29* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *05 September 2003* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Response to Amendment

1. Applicant's arguments with respect to claims 1-29, filed 11/5/2007 have been considered but are moot in view of the new ground(s) of rejection.

Claim Rejections - 35 USC § 101

2. Claims 11 – 14 are rejected under 35 U.S.C. 101 because: the claimed invention is directed to non-statutory subject matter.

Regarding claim 11, it is noted that, the claim invention is directed to an article of manufacture comprising; storage medium, and a plurality of programming instructions stored on the storage medium, the programming instructions designed to enable an apparatus to decode a first slice of a first frame of a video, and decode a second slice of a second frame of the video, and render the decoded first and second slices, wherein the first and second slices each comprise a plurality of non-sequential macro-blocks …, and wherein some of the decoding a second slice of a second frame of the video is contemporaneous with the decoding a first slice of a first frame of a video. The content of the invention for such article of manufacture as defined in specification (i.e., page12, lines 14-16, also in paragraph 0058 of Pub No. US 2005/0053157), does not satisfy the Interim Guidelines for Examination of Patent Applications for Patent Subject Matter Eligibility, MPEP 2106.01.

Since claims 12 - 14 depend from independent claim 11, claims 11 - 14 as a whole do not fall within the statutory classes under 35 U.S.C. 101.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. Claims 1 – 20, 24 and 26 - 29 are rejected under 35 U.S.C. 103(a) as being unpatentable over MacInnis (US 2004/0066852) in view of MacInnis (US 2003/0189982).

Regarding claim 1, MacInnis '852 discloses, method of decoding a first slice of a first frame of a video (please see; fig. 5 elements 550(0) and/or slice 0 and buffer 615A in fig. 6, page 3, paragraphs 0033-0034 and 0036, indicates decoding of different slices; for example, slice 550(0) and/or slice 0 as shown in the figures consider as a first slice of a first frame of a video), decode a second slice of a second frame of the video (please see; fig. 5, elements 550(1) and/or slice 1 and buffer 615B in fig. 6, page 3, paragraphs 0033-0034 and 0036, indicates decoding of different slices; for example, slice 550(1) and/or slice 1 as shown in the figures consider as a second slice of a second frame of a video), wherein the first and the second slices each comprise a plurality of non-sequential macro-blocks that are respectively selected from the first and second frame of the video (please see; fig. 6, selector 630 for selecting the macro-blocks, as indicated in abstract, lines 6-8 and page 3, paragraph 0038 and 0040 decoder selectively decodes the macro-block from the slices; also in abstract, lines 1-9, page 2, paragraph 0026 and page 3, paragraphs 0034-0035, indicates that the slice

groups do not necessarily comprises macro-blocks that are continuous, i.e., slice comprises non-contiguous macro-blocks).

It should be noted that, while MacInnis '852 discloses decoding a first slice of a first frame of a video (please see; fig. 5 elements 550(0) and/or 510(0) and buffer 615A in fig. 6, page 3, paragraphs 0033-0034 and 0036, indicates decoding of different slices; for example, slice 550(0) and/or slice 0 as shown in the figures consider as a first slice of a first frame of a video), decode a second slice of a second frame of the video (please see; fig. 5, elements 550(1) and/or 510(1) and buffer 615B in fig. 6, page 3, paragraphs 0033-0034 and 0036, indicates decoding of different slices; for example, slice 550(1) and/or slice 1 as shown in the figures consider as a second slice of a second frame of a video) using parallel buffers 615A and 615B as shown in fig. 6, where the slice groups comprises non-contiguous macro-block (please see; abstract) and selector to selectively decode the macro-blocks (i.e., fig. 6, selector 630, abstract, lines 6-7, page 3, paragraph 0034).

MacInnis '852 does not particularly state that the decoding of the slices are "contemporaneous".

However, MacInnis '982 teaches decoding of digital video by parallel processing of multiple rows, e.g., slices, (please see; fig. 1, parallel processors/decoders used for decoding multiple rows/slices concurrently, e.g., contemporaneous, abstract, lines 1-5, page 1, paragraph 0005 and page 2, paragraph 0021).

In view of the above, it would have been obvious to one having ordinary skill in the art at the time of the invention was made to improve the video decoding system of

MacInnis ‘852 in accordance with the teaching of MacInnis ‘982 by using multiple processor/decoders, in order to perform decoding operations in parallel on more than one row of compressed video data concurrently, as suggested by MacInnis ‘982 (i.e., page 1, paragraphs 0005 and 0008-0009).

Regarding claim 2, MacInnis ‘852 discloses, decoding of the first slice of a video (please see; fig. 5 elements 550(0) and/or 510(0) and buffer 615A in fig. 6, page 3, paragraphs 0033-0034 and 0036, indicates decoding of different slices; for example, slice 550(0) and/or slice 0 as shown in the figures consider as a first slice of a first frame of a video).

MacInnis ‘852 does not particularly states, determining whether the first slice has any decoding dependency on having one or more other slices decoded first, as specified in the claim.

However, MacInnis ‘982 (please see, fig. 3, element 303 check/determine dependencies, abstract, lines 1-7, page 1, paragraphs 0005 and 0012, page 2, paragraph 0031 and page 3, paragraph 0035) teaches decoding video by determining interdependencies, and processing/decoding rows/slices as soon as its dependencies are met.

In view of the above, it would have been obvious to one having ordinary skill in the art at the time of the invention was made to improve the video decoding system of MacInnis ‘852 in accordance with the teaching of MacInnis ‘982 by checking dependencies between rows/slices of the image, in order to perform decoding operations in parallel on more than one row/slice of compressed video data concurrently

as soon as its dependencies are met, as suggested by MacInnis '982 (i.e., page 1, paragraphs 0005 and 0009).

Regarding claim 3, the combination of MacInnis '852 and MacInnis '982 teaches, wherein the decoding of the first slice further comprises determining whether the one or more other slices on which decoding of the first slice depends have been decoded, if the first slice is determined to be dependent on having one or more other slices decoded first (MacInnis '982, fig. 3, element 303 for determining dependencies, page 2, paragraph 0031 and page 3, paragraph 0035 – 0036, indicates determination of whether the one or more other slices on which decoding of the first slice depends have been decoded).

Regarding claim 4, the combination of MacInnis '852 and MacInnis '982 teaches, wherein the decoding of the first slice further comprises temporarily suspending decoding the first slice if the first slice is determined to be dependent on having one or more other slices decoded first (please see MacInnis '982, page 1, paragraph 0012, page 2, paragraph 0031 – page 3, paragraphs 0033 and paragraph 0037; indicates suspension of decoding process of slice based on the one or more other slices decoded first), and at least one of the one or more other slices has not been decoded (please see MacInnis '982, page 1, paragraph 0012, page 2, paragraph 0031 – page 3, paragraphs 0033 and paragraph 0037; indicates suspension of decoding if one or more other slices based on the dependencies of the current slice/row has not been decoded).

Regarding claim 5, the combination of MacInnis '852 and MacInnis '982 teaches, wherein the decoding of the first slice further comprises decoding the first slice when all

of the one or more other slices on which decoding of the first slice depends have been decoded (please see MacInnis '982, page 1, paragraph 0012, page 2, paragraph 0031 – page 3, paragraphs 0033 and paragraph 0037; indicates suspension of decoding process of slice based on the one or more other slices decoded first).

Regarding claim 6, the combination of MacInnis '852 and MacInnis '982 teaches, wherein the decoding of the first slice further comprises, decoding the first slice on determining that the first slice has no decoding dependency (please see MacInnis '982, page 2, paragraphs 0028 – 0031, indicates first row/slice does not depends on any other row/slice, so decoding the first slice can start as soon as its dependencies met).

Regarding claim 7, the combination of MacInnis '852 and MacInnis '982 teaches, wherein the first and the second frame are the same frame (please see MacInnis, page 3, paragraphs 0031-0032 and 0038 and 0040, where indicates buffer 403 as shown in figs. 5-6, receives and stores picture 305 and the selector selectively decodes the macro-block from different slices of the same picture 305).

Regarding claim 8, MacInnis '852 discloses, retrieving a slice of a frame of a video (please see; the decoder 409 as shown in figs. 5-6 are for retrieving slice of a frame of a video from the buffer, page 3, paragraphs 0034 and 0038, also see fig. 7, decoding process as described in page 4, paragraphs 0042-0043), the slice comprising a plurality of non-sequential macro-blocks that are respectively selected from the frame of the video (please see; fig. 6, selector 630 for selecting the macro-blocks, as indicated in abstract, lines 6-8 and page 3, paragraph 0038 and 0040 decoder selectively decodes the macro-block from the slices; also in abstract, lines 1-9, page 2, paragraph

0026 and page 3, paragraphs 0034-0035, indicates that the slice groups do not necessarily comprises macro-blocks that are continuous, i.e., slice comprises non-contiguous macro-blocks).

MacInnis '852 does not particularly discloses, determining whether the slice has any decoding dependency on having one or more other slices decoded first, further determining whether the one or more other slices on which decoding of the slice depends have been decoded, if the slice is determined to be dependent on having one or more other slices decoded first, and temporarily suspending decoding the slice if the slice is determined to be dependent on having one or more other slices decoded first, and at least one of the one or more other slices has not been decoded, as specifies in the claim.

It is noted that, the above limitations as claimed are merely reciting the decoding process based on the dependencies status of the slices, and in reality the above limitations are not distinct from each other. Therefore;

MacInnis '982 (please see, fig. 3, element 303 check/determine dependencies, abstract, lines 1-7, page 1, paragraphs 0005 and 0012, page 2, paragraph 0031 and page 3, paragraph 0035) teaches decoding video by determining interdependencies, and processing/decoding rows/slices as soon as its dependencies are met, and further in (i.e., fig. 3, element 303 for determining dependencies, page 2, paragraph 0031 and page 3, paragraph 0035 – 0036, indicates determination of whether the one or more other slices on which decoding of the slice depends have been decoded), and the claimed temporarily suspending decoding the slice if the slice is determined to be

dependent on having one or more other slices decoded first (please see, page 1, paragraph 0012, page 2, paragraph 0031 – page 3, paragraphs 0033 and paragraph 0037; indicates suspension of decoding process of slice based on the one or more other slices decoded first) and at least one of the one or more other slices has not been decoded, as specifies in the claim. (Please see MacInnis '982, page 1, paragraph 0012, page 2, paragraph 0031 – page 3, paragraphs 0033 and paragraph 0037; indicates suspension of decoding if one or more other slices based on the dependencies of the current slice/row has not been decoded).

In view of the above, it would have been obvious to one having ordinary skill in the art at the time of the invention was made to improve the video decoding system of MacInnis '852 in accordance with the teaching of MacInnis '982 by checking dependencies between rows/slices of the image, in order to perform decoding operations in parallel on more than one row/slice of compressed video data concurrently as soon as its dependencies are met, as suggested by MacInnis '982 (i.e., page 1, paragraphs 0005 and 0009).

Regarding claim 9, the combination of MacInnis '852 and MacInnis '982 teaches, wherein the method of claim 8 further comprises decoding the slice when all of the one or more other slices on which decoding of the slice depends have been decoded (please see; MacInnis '982, page 1, paragraph 0012, page 2, paragraph 0031 – page 3, paragraphs 0033 and paragraph 0037; indicates decoding process of slice, e.g., first slice, based on the one or more other slices on which decoding of the first slice depends decoded first).

Regarding claim 10, the combination of MacInnis '852 and MacInnis '982 teaches, wherein the method further comprises decoding the slice on determining that the slice has no decoding dependency (please see MacInnis '982, page 2, paragraphs 0028 – 0031, indicates first row/slice does not depends on any other row/slice, so decoding the first slice can start as soon as its dependencies met, e.g., no decoding dependency).

Regarding claim 11, MacInnis '852 discloses, an article of manufacture comprising; storage medium (i.e., figs. 4 and 6, buffer memories 403, 615A and 615B, page 2, paragraph 0029, lines 8-12 and page 3, paragraph 30, lines 7-10 indicates decoding process may be implemented as hardware designed or may be implemented as software on a programmable processor or some combination thereof), a plurality of programming instructions stored on the storage medium (i.e., as indicated in page 2, paragraph 0029, lines 8-12 and page 3, paragraph 30, lines 7-10 decoding process may be implemented as hardware designed or may be implemented as software, e.g., program instructions, on a programmable processor or some combination thereof; thus necessitate the storage of the program instructions to carry on the process of decoding), the programming instructions designed to enable an apparatus to (i.e., figs. 4 and 6, buffer memories 403, 615A and 615B, page 2, paragraph 0029, lines 8-12 and page 3, paragraph 30, lines 7-10 indicates decoding process may be implemented as hardware designed or may be implemented as software, e.g., program instructions, on a programmable processor or some combination thereof to carry on the process of decoding), decode a first slice of a first frame of a video (please see; fig. 5 elements

550(0) and/or slice 0 and buffer 615A in fig. 6, page 3, paragraphs 0033-0034 and 0036, indicates decoding of different slices; for example, slice 550(0) and/or slice 0 as shown in the figures consider as a first slice of a first frame of a video), decode a second slice of a second frame of the video (please see; fig. 5, elements 550(1) and/or 510(1) and buffer 615B in fig. 6, page 3, paragraphs 0033-0034 and 0036, indicates decoding of different slices; for example, slice 550(1) and/or slice 1 as shown in the figures consider as a second slice of a second frame of a video), and render the decoded first and second slices (please see; figs. 4-5, combination elements 409 and 411 for providing the video sequence 105' to display has to render the decoded slices in steps 411 for transmission to the display device).

wherein the first and the second slices each comprise a plurality of non-sequential macro-blocks that are respectively selected from the first and second frame of the video (please see; fig. 6, selector 630 for selecting the macro-blocks, as indicated in abstract, lines 6-8 and page 3, paragraph 0038 and 0040 decoder selectively decodes the macro-block from the slices; also in abstract, lines 1-9, page 2, paragraph 0026 and page 3, paragraphs 0034-0035, indicates that the slice groups do not necessarily comprises macro-blocks that are continuous, i.e., slice comprises non-contiguous macro-blocks).

It should be noted that, while MacInnis '852 discloses decoding a first slice of a first frame of a video (please see; fig. 5 elements 550(0) and/or 510(0) and buffer 615A in fig. 6, page 3, paragraphs 0033-0034 and 0036, indicates decoding of different slices; for example, slice 550(0) and/or slice 0 as shown in the figures consider as a first slice

of a first frame of a video), decode a second slice of a second frame of the video (please see; fig. 5, elements 550(1) and/or 510(1) and buffer 615B in fig. 6, page 3, paragraphs 0033-0034 and 0036, indicates decoding of different slices; for example, slice 550(1) and/or slice 1 as shown in the figures consider as a second slice of a second frame of a video) using parallel buffers 615A and 615B as shown in fig. 6, where the slice groups comprises non-contiguous macro-block (please see; abstract) and selector to selectively decode the macro-blocks (i.e., fig. 6, selector 630, abstract, lines 6-7, page 3, paragraph 0034).

MacInnis '852 does not particularly state that the decoding of the slices are "contemporaneous".

However, MacInnis '982 teaches decoding of digital video by parallel processing of multiple rows, e.g., slices, (please see; fig. 1, parallel processors/decoders used for decoding multiple rows/slices concurrently, e.g., contemporaneous, abstract, lines 1-5, page 1, paragraph 0005 and page 2, paragraph 0021).

In view of the above, it would have been obvious to one having ordinary skill in the art at the time of the invention was made to improve the video decoding system of MacInnis '852 in accordance with the teaching of MacInnis '982 by using multiple processor/decoders, in order to perform decoding operations in parallel on more than one row of compressed video data concurrently, as suggested by MacInnis '982 (i.e., page 1, paragraphs 0005 and 0008-0009).

Regarding claim 12, MacInnis '852 discloses, decode a first slice of a video (please see; fig. 5 elements 550(0) and/or 510(0) and buffer 615A in fig. 6, page 3,

paragraphs 0033-0034 and 0036, indicates decoding of different slices; for example, slice 550(0) and/or slice 0 as shown in the figures consider as a first slice of a first frame of a video).

MacInnis '852 does not particularly discloses, determining whether the first slice has any decoding dependency on having one or more other slices decoded first, further determining whether the one or more other slices on which decoding of the slice depends have been decoded, if the slice is determined to be dependent on having one or more other slices decoded first, and temporarily suspending decoding the slice if the slice is determined to be dependent on having one or more other slices decoded first, and at least one of the one or more other slices has not been decoded, as specifies in the claim.

It is noted that, the above limitations as claimed are merely reciting the decoding process based on the dependencies status of the slices, and in reality the above limitations are not distinct from each other. Therefore;

MacInnis '982 (please see, fig. 3, element 303 check/determine dependencies, abstract, lines 1-7, page 1, paragraphs 0005 and 0012, page 2, paragraph 0031 and page 3, paragraph 0035) teaches decoding video by determining interdependencies, and processing/decoding rows/slices as soon as its dependencies are met, and further in (i.e., fig. 3, element 303 for determining dependencies, page 2, paragraph 0031 and page 3, paragraph 0035 – 0036, indicates determination of whether the one or more other slices on which decoding of the slice depends have been decoded), and the claimed temporarily suspending decoding the slice if the slice is determined to be

dependent on having one or more other slices decoded first (please see, page 1, paragraph 0012, page 2, paragraph 0031 – page 3, paragraphs 0033 and paragraph 0037; indicates suspension of decoding process of slice based on the one or more other slices decoded first) and at least one of the one or more other slices has not been decoded, as specifies in the claim. (Please see MacInnis '982, page 1, paragraph 0012, page 2, paragraph 0031 – page 3, paragraphs 0033 and paragraph 0037; indicates suspension of decoding if one or more other slices based on the dependencies of the current slice/row has not been decoded).

In view of the above, it would have been obvious to one having ordinary skill in the art at the time of the invention was made to improve the video decoding system of MacInnis '852 in accordance with the teaching of MacInnis '982 by checking dependencies between rows/slices of the image, in order to perform decoding operations in parallel on more than one row/slice of compressed video data concurrently as soon as its dependencies are met, as suggested by MacInnis '982 (i.e., page 1, paragraphs 0005 and 0009).

Regarding claim 13, the combination of MacInnis '852 and MacInnis '982 teaches the article of claim 12, wherein the programming instructions are further designed to enable the apparatus to decode the first slice when all of the one or more other slices on which decoding of the first slice depends have been decoded (please see; MacInnis '982, page 1, paragraph 0012, page 2, paragraph 0031 – page 3, paragraphs 0033 and paragraph 0037; indicates decoding process of slice, e.g., first slice, based on the one or more other slices on which decoding of the first slice depends decoded first).

Regarding claim 14, the combination of MacInnis '852 and MacInnis '982 teaches, the article of claim 12, wherein the programming instructions are further designed to enable the apparatus to decode the first slice on determining that the first slice has no decoding dependency (please see; MacInnis '982, page 2, paragraphs 0028 – 0031, indicates first row/slice does not depends on any other row/slice, so decoding the first slice can start as soon as its dependencies met, e.g., no decoding dependency).

Regarding claim 15, MacInnis '852 discloses, an apparatus comprising; a buffer to store frames of a video (i.e., figs. 5 and 6, buffer 403 used for storing the video frames), a first decoding unit coupled to the buffer to decode a first slice of a first frame of the video (please see; figs. 5-6, decoder 409 coupled to the buffer 403 to decode a first slice, i.e., 550(0) and/or 510(0) slice 0, of a first video frame, page 3, paragraphs 0031-0034), decode a second slice of a second frame of the video (please see; figs. 5-6, decoder 409 for decoding a second slice of a second frame of the video, elements 550(1) and/or 510(1) slice 1, page 3, paragraphs 0033-0034 and 0036), wherein the first and the second slices each comprise a plurality of non-sequential macro-blocks that are respectively selected from the first and second frame of the video (please see; fig. 6, selector 630 for selecting the macro-blocks, as indicated in abstract, lines 6-8 and page 3, paragraph 0038 and 0040 decoder selectively decodes the macro-block from the slices; also in abstract, lines 1-9, page 2, paragraph 0026 and page 3, paragraphs 0034-0035, indicates that the slice groups do not necessarily comprises macro-blocks that are continuous, i.e., slice comprises non-contiguous macro-blocks).

It should be noted that, while MacInnis '852 discloses a decoding unit 409 coupled to the parallel buffers 61A and 615B for decoding the slices of the video fame.

MacInnis '852 does not particularly show or states "a second decoding unit" as specifies in the claim.

However, MacInnis '982 (please se; fig. 1, decoding units 1 – N, page 1, paragraphs 0005 and 0012) teaches parallel decoding units 1 – N coupled to the memory, e.g., buffer memory, 105 for processing of multiple region of images in parallel.

In view of the above, it is within the knowledge of one of ordinary skill in the art at the time of the invention was made to improve the video decoding system of MacInnis '852 by replacing the single decoding unit 409 as disclosed by MacInnis '982 with multiple parallel decoding units 103 as taught by MacInnis '982, in order to perform decoding operations in parallel on more than one row of compressed video data concurrently, as suggested by MacInnis '982 (i.e., page 1, paragraphs 0005 and 0008-0009). Further;

It should be noted that, while MacInnis '852 discloses decoding a first slice of a first frame of a video, and decode a second slice of a second frame of the video, as discussed in the above claim, using parallel buffers 615A and 615B as shown in fig. 6, where the slice groups comprises non-contiguous macro-block (please see; abstract) and selector to selectively decode the macro-blocks (i.e., fig. 6, selector 630, abstract, lines 6-7, page 3, paragraph 0034).

MacInnis '852 does not particularly state that the decoding of the slices are "contemporaneous".

However, MacInnis '982 teaches decoding of digital video by parallel processing of multiple rows, e.g., slices, (please see; fig. 1, parallel processors/decoders used for decoding multiple rows/slices concurrently, e.g., contemporaneous, abstract, lines 1-5, page 1, paragraph 0005 and page 2, paragraph 0021).

In view of the above, it would have been obvious to one having ordinary skill in the art at the time of the invention was made to improve the video decoding system of MacInnis '852 in accordance with the teaching of MacInnis '982 by using multiple processor/decoders, in order to perform decoding operations in parallel on more than one row of compressed video data concurrently, as suggested by MacInnis '982 (i.e., page 1, paragraphs 0005 and 0008-0009).

Regarding claim 16, MacInnis '852 discloses, decoding of the first slice of a video (please see; fig. 5 elements 550(0) and/or 510(0) and buffer 615A in fig. 6, page 3, paragraphs 0033-0034 and 0036, indicates decoding of different slices; for example, slice 550(0) and/or slice 0 as shown in the figures consider as a first slice of a first frame of a video).

MacInnis '852 does not particularly states, determining whether the first slice has any decoding dependency on having one or more other slices decoded first, as specified in the claim.

However, MacInnis '982 (please see, fig. 3, element 303 check/determine dependencies, abstract, lines 1-7, page 1, paragraphs 0005 and 0012, page 2, paragraph 0031 and page 3, paragraph 0035) teaches decoding video by determining

interdependencies, and processing/decoding rows/slices as soon as its dependencies are met.

In view of the above, it would have been obvious to one having ordinary skill in the art at the time of the invention was made to improve the video decoding system of MacInnis '852 in accordance with the teaching of MacInnis '982 by checking dependencies between rows/slices of the image, in order to perform decoding operations in parallel on more than one row/slice of compressed video data concurrently as soon as its dependencies are met, as suggested by MacInnis '982 (i.e., page 1, paragraphs 0005 and 0009).

Regarding claim 17, the combination of MacInnis '852 and MacInnis '982 teaches, wherein the first decoding unit further comprises logic to determine whether the one or more other slices on which decoding of the first slice depends have been decoded, if the first slice is determined to be dependent on having one or more other slices decoded first (MacInnis '982, fig. 3, element 303 for determining dependencies, page 2, paragraph 0031 and page 3, paragraph 0035 – 0036, indicates determination of whether the one or more other slices on which decoding of the first slice depends have been decoded).

Regarding claim 18, the combination of MacInnis '852 and MacInnis '982 teaches, wherein the first decoding unit further comprises logic to temporarily suspending decoding the first slice if the first slice is determined to be dependent on having one or more other slices decoded first (please see MacInnis '982, page 1, paragraph 0012, page 2, paragraph 0031 – page 3, paragraphs 0033 and paragraph

0037; indicates suspension of decoding process of slice based on the one or more other slices decoded first), and at least one of the one or more other slices has not been decoded (please see MacInnis '982, page 1, paragraph 0012, page 2, paragraph 0031 – page 3, paragraphs 0033 and paragraph 0037; indicates suspension of decoding if one or more other slices based on the dependencies of the current slice/row has not been decoded).

Regarding claim 19, the combination of MacInnis '852 and MacInnis '982 teaches, wherein the first decoding further comprises logic to decode the first slice when all of the one or more other slices on which decoding of the first slice depends have been decoded (please see MacInnis '982, page 1, paragraph 0012, page 2, paragraph 0031 – page 3, paragraphs 0033 and paragraph 0037; indicates suspension of decoding process of slice based on the one or more other slices decoded first).

Regarding claim 20, the combination of MacInnis '852 and MacInnis '982 teaches, wherein the first decoding further comprises logic to decode the first slice on determining that the first slice has no decoding dependency (please see MacInnis '982, page 2, paragraphs 0028 – 0031, indicates first row/slice does not depends on any other row/slice, so decoding the first slice can start as soon as its dependencies met).

Regarding claim 24, MacInnis '852 discloses, a decoding unit comprises threads of programming instructions designed to perform the decoding respectively (please see; figs. 5-6, decoding unit 409 and as stated in paragraph 0029, lines 8-12 and page 3, paragraph 30, lines 7-10 indicates decoding process may be implemented as hardware designed or may be implemented as software on a programmable processor or some

combination thereof to perform the decoding respectively), and further comprises one or more memory units to store the programming instructions (i.e., figs. 5-6, page 5, lines 6-8, indicates memory to store plurality of instructions, e.g., programming instructions), and at least one processor coupled to the one or more memory units to execute the first threads of programming instructions (i.e., figs. 5-6, page 5, lines 6-8, indicates processor for executing the instructions stored in the memory unit).

It should be noted that, while MacInnis '852 discloses a decoding unit 409 coupled to the buffer memories 61A and 615B to perform decoding process of the video fame.

MacInnis '852 does not particularly show or states "second decoding unit" as specifies in the claim.

However, MacInnis '982 (please se; fig. 1, decoding units 1 – N, page 1, paragraphs 0005 and 0012) teaches parallel decoding units 1 – N coupled to the memory, e.g., buffer memory, 105 for processing of multiple region of images in parallel.

In view of the above, it is within the knowledge of one of ordinary skill in the art at the time of the invention was made to improve the video decoding system of MacInnis '852 by replacing the single decoding unit 409 as disclosed by MacInnis '982 with multiple parallel decoding units 103 as taught by MacInnis '982, in order to perform decoding operations in parallel on more than one row of compressed video data concurrently, as suggested by MacInnis '982 (i.e., page 1, paragraphs 0005 and 0008-0009).

Regarding claim 26, MacInnis '852 discloses, a system comprising; a video provider to provide an encoded video (please see; as shown in figs. 1 and 4-6, video provider provides an encoded video data stream AVC 142), and a video renderer coupled to the video provider to receive the encoded video (please see; as shown in figs. 1 and 4-6, the decoder 409, consider as renderer coupled to the provider to receive the encoded video data), decode the received video (i.e., figs. 1 and 4-6, decoder unit 409 and/or 145), and render the decoded video (i.e., fig. 1, display unit 110 and fig. 4, steps 411, for rendering the decoded video), including; a first decoding unit to decode a first slice of a first frame of the video (please see; figs. 5-6, decoder 409 coupled to the buffer 403 to decode a first slice, i.e., 550(0) and/or 510(0) slice 0, of a first video frame, page 3, paragraphs 0031-0034), decode a second slice of a second frame of the video (please see; figs. 5-6, decoder 409 for decoding a second slice of a second frame of the video, elements 550(1) and/or 510(1) slice 1, page 3, paragraphs 0033-0034 and 0036), wherein the first and the second slices each comprise a plurality of non-sequential macro-blocks that are respectively selected from the first and second frame of the video (please see; fig. 6, selector 630 for selecting the macro-blocks, as indicated in abstract, lines 6-8 and page 3, paragraph 0038 and 0040 decoder selectively decodes the macro-block from the slices; also in abstract, lines 1-9, page 2, paragraph 0026 and page 3, paragraphs 0034-0035, indicates that the slice groups do not necessarily comprises macro-blocks that are continuous, i.e., slice comprises non-contiguous macro-blocks).

It should be noted that, while MacInnis '852 discloses a decoding unit 409 coupled to the parallel buffers 61A and 615B for decoding the slices of the video fame.

MacInnis '852 does not particularly show or states "a second decoding" as specifies in the claim.

However, MacInnis '982 (please se; fig. 1, decoding units 1 – N, page 1, paragraphs 0005 and 0012) teaches parallel decoding units 1 – N coupled to the memory, e.g., buffer memory, 105 for processing of multiple region of images in parallel.

In view of the above, it is within the knowledge of one of ordinary skill in the art at the time of the invention was made to improve the video decoding system of MacInnis '852 by replacing the single decoding unit 409 as disclosed by MacInnis '982 with multiple parallel decoding units 103 as taught by MacInnis '982, in order to perform decoding operations in parallel on more than one row of compressed video data concurrently, as suggested by MacInnis '982 (i.e., page 1, paragraphs 0005 and 0008-0009). Further;

It should be noted that, while MacInnis '852 discloses decoding a first slice of a first frame of a video, and decode a second slice of a second frame of the video, as discussed in the above claim, using parallel buffers 615A and 615B as shown in fig. 6, where the slice groups comprises non-contiguous macro-block (please see; abstract) and selector to selectively decode the macro-blocks (i.e., fig. 6, selector 630, abstract, lines 6-7, page 3, paragraph 0034).

MacInnis '852 does not particularly state that the decoding of the slices are "contemporaneous".

However, MacInnis '982 teaches decoding of digital video by parallel processing of multiple rows, e.g., slices, (please see; fig. 1, parallel processors/decoders used for decoding multiple rows/slices concurrently, e.g., contemporaneous, abstract, lines 1-5, page 1, paragraph 0005 and page 2, paragraph 0021).

In view of the above, it would have been obvious to one having ordinary skill in the art at the time of the invention was made to improve the video decoding system of MacInnis '852 in accordance with the teaching of MacInnis '982 by using multiple processor/decoders, in order to perform decoding operations in parallel on more than one row of compressed video data concurrently, as suggested by MacInnis '982 (i.e., page 1, paragraphs 0005 and 0008-0009).

Regarding claim 27, MacInnis '852 discloses, wherein the first decoding unit of the video renderer is equipped to (please see; as shown in figs. 1 and 4-6, the decoder 409, consider as renderer to receive the encoded video data).

MacInnis '852 does not particularly discloses, determining whether the first slice has any decoding dependency on having one or more other slices decoded first, further determining whether the one or more other slices on which decoding of the slice depends have been decoded, if the slice is determined to be dependent on having one or more other slices decoded first, and temporarily suspend decoding the first slice if the first slice is determined to be dependent on having one or more other slices decoded first, and at least one of the one or more other slices has not been decoded, as specifies in the claim.

It is noted that, the above limitations as claimed are merely reciting the decoding process based on the dependencies status of the slices, and in reality the above limitations are not distinct from each other. Therefore;

MacInnis '982 (please see, fig. 3, element 303 check/determine dependencies, abstract, lines 1-7, page 1, paragraphs 0005 and 0012, page 2, paragraph 0031 and page 3, paragraph 0035) teaches decoding video by determining interdependencies, and processing/decoding rows/slices as soon as its dependencies are met, and further in (i.e., fig. 3, element 303 for determining dependencies, page 2, paragraph 0031 and page 3, paragraph 0035 – 0036, indicates determination of whether the one or more other slices on which decoding of the slice depends have been decoded), and the claimed temporarily suspending decoding the slice if the slice is determined to be dependent on having one or more other slices decoded first (please see, page 1, paragraph 0012, page 2, paragraph 0031 – page 3, paragraphs 0033 and paragraph 0037; indicates suspension of decoding process of slice based on the one or more other slices decoded first) and at least one of the one or more other slices has not been decoded, as specifies in the claim. (Please see MacInnis '982, page 1, paragraph 0012, page 2, paragraph 0031 – page 3, paragraphs 0033 and paragraph 0037; indicates suspension of decoding if one or more other slices based on the dependencies of the current slice/row has not been decoded).

In view of the above, it would have been obvious to one having ordinary skill in the art at the time of the invention was made to improve the video decoding system of MacInnis '852 in accordance with the teaching of MacInnis '982 by checking

dependencies between rows/slices of the image, in order to perform decoding operations in parallel on more than one row/slice of compressed video data concurrently as soon as its dependencies are met, as suggested by MacInnis '982 (i.e., page 1, paragraphs 0005 and 0009).

Regarding claim 28, the combination of MacInnis '852 and MacInnis '982 teaches, wherein the first decoding unit of the video renderer is further equipped to decode the first slice when all of the one or more other slices on which decoding of the first slice depends have been decoded (please see; MacInnis '982, page 1, paragraph 0012, page 2, paragraph 0031 – page 3, paragraphs 0033 and paragraph 0037; indicates decoding process of slice, e.g., first slice, based on the one or more other slices on which decoding of the first slice depends decoded first).

Regarding claim 29, the combination of MacInnis '852 and MacInnis '982 teaches, wherein the first decoding unit of the video renderer is further equipped to decode the first slice on determining that the first slice has no decoding dependency (please see MacInnis '982, page 2, paragraphs 0028 – 0031, indicates first row/slice does not depends on any other row/slice, so decoding the first slice can start as soon as its dependencies met, e.g., no decoding dependency).

5. Claims 21 – 23 and 25 are rejected under 35 U.S.C. 103(a) as being unpatentable over MacInnis (US 2004/0066852) in view of MacInnis (US 2003/0189982) further in view of Biblil et al. (US 6,704,361).

Regarding claim 21, MacInnis '982 teaches system and method that supports processing of multiple regions of an image in parallel using multiple decoding units, first

and second decoding units and hardware to perform the process of decoding of the video frames (please see, fig. 1, decoding units 103).

MacInnis '982 does not particularly teaches "specific integrated circuits (ASIC)" as specifies in the claim.

Biblil (please see; fig. 1, col. 4, lines 62-col. 5, lines 10) teaches, Preferably decoding system 100 is configured as an application specific integrated circuit (ASIC) for the purposes of digital audio/video reception in digital versatile disk (DVD) and digital video broadcasting (DVB) set-top-box (STB) applications.

In view of the above, it would have been obvious to one having ordinary skill in the art at the time of the invention was made to configure the decoding system of MacInnis in accordance with the teaching of Biblil, as an application specific integrated circuit (ASIC), in order to efficiently decodes variable length DCT coefficients and motion vectors and minimizes the amount of memory required to decode the various MPEG variable length codes, as suggested by Biblil (i.e., col. 2, lines 66-col. 3, lines 5).

Regarding claim 22, MacInnis '852 discloses, transmission system for providing a video stream to a display over a communication medium, communication medium applications such as, point-to-point link or network, internet, satellite or any combination thereof (i.e., page 2, paragraphs 0022 – 0023), and decoding unit including programming instructions designed to perform the decoding of the video frames respectively (please see; figs. 1 and 5-6, decoding unit 409 and as stated in paragraph 0029, lines 8-12 and page 3, paragraph 30, lines 7-10 indicates decoding process may be implemented as hardware designed or may be implemented as software on a

programmable processor or some combination thereof to perform the decoding respectively).

MacInnis '852 does not particularly disclose, "circuit board comprising an application specific integrated circuit (ASIC)", as specifies in the claim.

Biblil (please see; fig. 1, col. 5, lines 1-3) teaches application specific integrated circuit (ASIC) board for the purpose of audio/video reception in digital versatile disk and digital video broadcasting DVB, set-top box STB applications.

In view of the above, it would have been obvious to one having ordinary skill in the art at the time of the invention was made to configure the decoding system of MacInnis in accordance with the teaching of Biblil, as an application specific integrated circuit (ASIC) board, for the purpose of audio/video reception in digital versatile disk and digital video broadcasting DVB, set-top box STB applications, as suggested by Biblil (i.e., col. 5, lines 1-7).

Regarding claim 23, MacInnis '852 discloses, transmission system for providing a video stream to a display over a communication medium, communication medium applications such as, point-to-point link or network, internet, satellite or any combination thereof (i.e., page 2, paragraphs 0022 – 0023), and decoding unit including programming instructions designed to perform the decoding of the video frames respectively (please see; figs. 1 and 5-6, decoding unit 409 and as stated in paragraph 0029, lines 8-12 and page 3, paragraph 30, lines 7-10 indicates decoding process may be implemented as hardware designed or may be implemented as software on a

programmable processor or some combination thereof to perform the decoding respectively).

MacInnis '852 does not particularly state, "selected one of a palm sized computing device, a wireless mobile phone, a digital personal assistant, a laptop computing device, a desktop computing device, a set-top box, a server, a digital versatile disk player, a television and a display monitor", as specifies in the claim.

Biblil (please see; fig. 1, col. 5, lines 1-3) teaches the integrated circuit ASIC for the purpose of audio/video reception in digital versatile disk and digital video broadcasting DVB, set-top box STB applications.

In view of the above, it would have been obvious to one having ordinary skill in the art at the time of the invention was made to configure the decoding system of MacInnis in accordance with the teaching of Biblil, as an application specific integrated circuit (ASIC), for the purpose of audio/video reception in digital versatile disk and digital video broadcasting DVB, set-top box STB applications, as suggested by Biblil (i.e., col. 5, lines 1-7).

Regarding claim 25, MacInnis '852 discloses, transmission system for providing a video stream to a display over a communication medium, communication medium applications such as, point-to-point link or network, internet, satellite or any combination thereof (i.e., page 2, paragraphs 0022 – 0023), and decoding unit including programming instructions designed to perform the decoding of the video frames respectively (please see; figs. 1 and 5-6, decoding unit 409 and as stated in paragraph 0029, lines 8-12 and page 3, paragraph 30, lines 7-10 indicates decoding process may

be implemented as hardware designed or may be implemented as software on a programmable processor or some combination thereof to perform the decoding respectively).

MacInnis '852 does not particularly state, "selected one of a palm sized computing device, a wireless mobile phone, a digital personal assistant, a laptop computing device, a desktop computing device, a set-top box, a server, a digital versatile disk player, a television and a display monitor, as specifies in the claim.

Biblil (please see; fig. 1, col. 5, lines 1-3) teaches the integrated circuit ASIC for the purpose of audio/video reception in digital versatile disk and digital video broadcasting DVB, set-top box STB applications.

In view of the above, it would have been obvious to one having ordinary skill in the art at the time of the invention was made to configure the decoding system of MacInnis in accordance with the teaching of Biblil, as an application specific integrated circuit (ASIC), for the purpose of audio/video reception in digital versatile disk and digital video broadcasting DVB, set-top box STB applications, as suggested by Biblil (i.e., col. 5, lines 1-7).

Contact

6. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Behrooz Senfi whose telephone number is 571-272-7339. The examiner can normally be reached on M-F 7:00-3:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mehrdad Dastouri can be reached on 571-272-7418. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Behrooz Senfi/
Primary Examiner
Art Unit 2621